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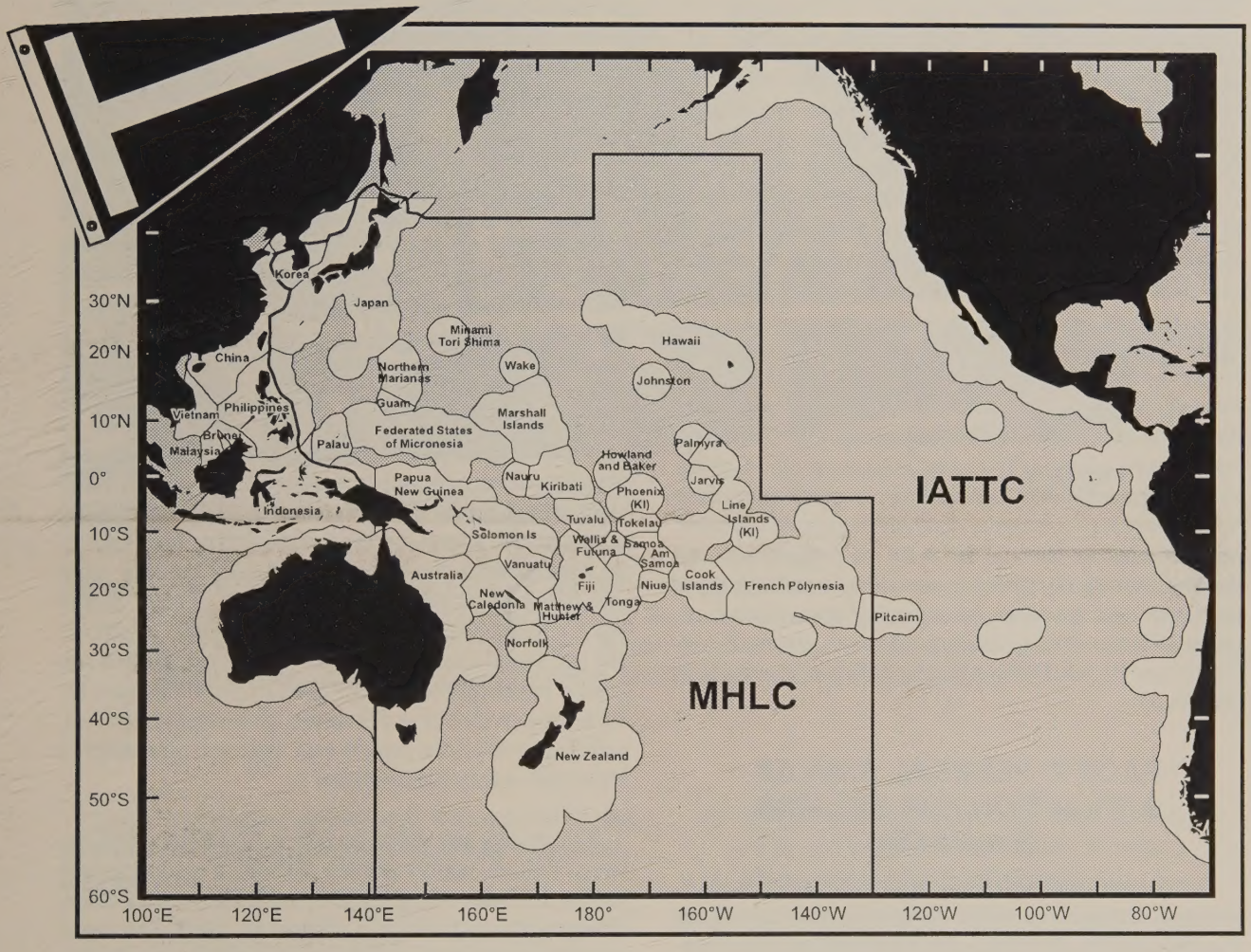
The Southwest Fisheries Science Center's

2000 Billfish Newsletter



Pacific Federal Angler Affiliation for Billfish (PacFAAB) Results of Cooperative Programs

- Trends in 1999 Billfish Angler Catch Rates
- 1999 Billfish Tagging and Recoveries
- AFTCO's Pacific Tag-Flag Tournament Results
- Recreational Billfish Angling in Mexico

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Introduction

The Southwest Fisheries Science Center's (SWFSC) billfish research programs provide information for the conservation and management of billfish resources in the Pacific. Our commitment is to provide the best precautionary management advice for U.S. Fishery Management Councils and international conventions through sound fishery research and data analysis.

This *Billfish Newsletter* is an annual publication that describes the primary components of billfish research at the SWFSC. The *International Billfish Angling Survey* provides angler catch and fishing effort information. The *Billfish Tagging Program* provides data on the biology, distribution and migration patterns of Pacific billfish. Both investigations rely on continued cooperation from billfish anglers, sport fishing clubs, commercial fishers and agencies affiliated with the SWFSC.

In 1999, these programs were re-evaluated in light of emerging issues resulting from Pacific wide changes in management of billfish and other highly migratory fish. As a result many new research objectives were identified, but means are lacking to conduct the research. A workshop between SWFSC staff and representatives from the billfish angling community was held to examine possible opportunities to elevate the level of cooperation and thereby increase our ability to conduct research needed to meet the new demands of emerging management regimes. That workshop resulted in a new cooperative effort termed Pacific Federal Angler Affiliation for Billfish (PacFAAB).

PACIFIC FEDERAL ANGLER AFFILIATION FOR BILLFISH (PacFAAB)

Pacific billfishes will soon be covered under an international management treaty covering a vast area of the Pacific. An international convention for long-term conservation and management of Pacific billfish and tunas is currently being drafted by the Multilateral High Level Conferences. Concurrently the Pacific Fishery Management Council is developing a fishery management plan for highly migratory species within the EEZ off the U.S. west coast, and the Western Pacific Fishery Management Council's fishery management plan is already in place for highly migratory species in the EEZ of the Hawaiian archipelago (cover).

These management groups provide new opportunities for effective management of Pacific billfish stocks. Progress toward assessment of stock condition and collection of needed data has been slow during the last 10 years. Current stock assessments are needed to meet these new management requirements for most major species of Pacific billfishes. Measures of fishing effort, the basis of even the simplest assessment models, are difficult to apply to fisheries where billfish are a by-product. More sophisticated models are unreliable or imprecise because they lack specific biological information such as age-structured catch data, estimates of basic life history parameters, natural mortality estimates, and measures of maturity and fecundity. Without better biological information, international and federal initiatives to manage Pacific billfish resources will be ineffective.

Future stock assessments require a major advance in knowledge of Pacific billfishes. In particular, the geographic limits of the stocks need better definition, our knowledge of age, growth and reproductive effort needs to be expanded, the effectiveness of tag and release methodology needs to be evaluated, and better indices of abundance are required. Unfortunately, billfish are largely unavailable for scientific examination.

The rarity of billfish encounters and difficulties of capture dictate that an alliance between fishermen and scientists is the only way to improve knowledge of these stocks. Fortunately modern technology such as, molecular diagnostic assays, archival transmitting tags, and laser measurement devices can potentially produce more and better information from the brief contact period when a fish is brought to the boat for tagging. Small tissue and blood samples collected from released fish can greatly improve stock assessments by providing new information on the stress of capture, post-release survival, population structure, growth rate, age, sex, reproductive state, and nutritional condition.

To expand and enhance research collaboration between billfish anglers and the SWFSC a workshop was held at the Balboa Angling Club of Southern California, Newport Beach, California, August 11, 1999. The workshop objective was to develop a research plan for the Pacific Federal Angler Affiliation for Billfish (PacFAAB) that will provide for the collection of information needed for Pacific billfish stock assessment and management (Figure 1, workshop participants). The consensus of the workshop, was that a cooperative program between billfish anglers and their organizations, the SWFSC, California Department of Fish and Game and other governments, particularly Mexico, has a great potential for improving the level of knowledge on Pacific billfish.

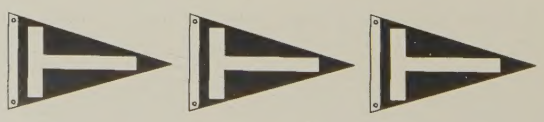


Figure 1. Pacific Federal Angler Affiliation for Billfish workshop participants. *Top row from left*: Pedro Ulloa, Norm Bartoo, Tom Raftican, Vince Buonaccorsi, Bill Shedd, Russ Vetter, Sean Mulrooney, Mike Hurt, Stan Ecklund, Ron Gaul, John Hunter, Dean Plant. *Bottom row from left*: Steve Crooke, Dave Holts, Rod McInnis, Marty Golden, John Riordan, Steve Bledsoe, Rich Hamilton, Milt Shedd, and Mark Wisch.

Seven cooperative action items were identified that could expand the existing level of knowledge using existing resources.

1) Club representatives agreed to implement a *volunteer bridge* log for recreational billfish fishing to establish a time series of catch per unit of effort as a tool to detect trends in abundance.

2) SWFSC will establish a *PacFAAB Web site* where information collected by joint efforts of anglers and SWFSC scientific staff will be available to all interested groups.

3) Club representatives agreed to adopt a *nominal length classification system* for estimating the length of released fish.

4) SWFSC will *recover historic catch records* from archived club records and develop a time series of relative abundance.

5) Club representatives agreed to work with SWFSC to *upgrade billfish tournament records* to include measures of total fishing effort so that catch per unit of effort can be estimated for numbers of sighted, hooked, caught, and released fish.

6) SWFSC will implement *tissue sampling for genetic and physiological studies* and provide sampling kits to club members.

7) SWFSC will develop a *draft plan for a cooperative angler-SWFSC research program* on Pacific billfish (PacFAAB).

There has been much progress on each of these seven actions since the PacFAAB workshop: the volunteer bridge log has been designed and is being tested for reliability and acceptance by the angling community; the new PacFAAB web site, although still under construction, is on line with new additions posted as available; a length classification system was developed and included on the volunteer bridge log; historical club catch data have been collected and digitized for the San Diego Marlin Club, Balboa Angling Club and the Tuna Club of Avalon; a minimum set of required data for tournaments is being developed for marlin tournaments; a tissue sampling protocol with collecting kits is now available for interested anglers; finally, the PacFAAB research plan for expanded cooperative angler-SWFSC research is complete and available on the web site.

We, at the SWFSC, want this new level of cooperation to continue to grow and encourage your individual and collective support and participation. We welcome your comments and ideas. Please feel free to call or e-mail this office any time.

THE INTERNATIONAL BILLFISH SURVEY

The *International Billfish Angling Survey* began in 1969 and now provides a 31-year time series of angler catch rates in key locations throughout the Pacific. Changes in catch per angler day, a measure of angler success, reflect changes in billfish abundance for those key locations. Any change in the relative abundance is important for understanding the impact of fisheries on billfish resources and is a primary component of stock assessment models.

In 1999, 645 billfish anglers reported catching 4,061 billfish during 8,463 fishing days. The annual mean catch per effort (measured in catch per day fished) was 0.48 billfish per angler-day in 1999 and 0.42 in 1998 (Table 1). The total number of angler-days reported for 1999 was nearly the same as in 1998, when anglers reported catching 3,726 billfish during 8,773 days of fishing. The current mean catch rate of 0.48 is slightly greater than the prior five-year average of 0.47 (1994 to 1998). The highest reported catch rate (0.57) occurred during the first years of this Survey (1969 to 1971). The lowest catch rates occurred in the mid-1970s, averaging about 0.34. These catch rates are annual means, calculated over the entire reporting year, and do not indicate seasonal highs or lows encountered in any particular region.

Trends in mean angler catch rates recorded by the *Billfish Angling Survey* from 1969 to 1999 are shown graphically in Figure 2. Catch rates for striped marlin reported at the southern tip of Baja California Sur were 0.41 billfish per angler day, 0.36 for all of Mexico and are

Table 1. Results of 1999 *Billfish Angler Survey*. Data in parentheses are values recorded in 1998. Species codes are striped marlin (SM), blue marlin (BLM), black marlin (BKM), and sailfish (SF).

LOCATION	ANGLER FISHING DAYS	BILLFISH PER FISHING DAY (CPUE)	MAJOR SPECIES
PACIFIC OCEAN			
Hawaii, U.S.A.	3,402 (3,434)	0.41 (0.29)	BLM
Southern California, U.S.A.	1,729 (1,752)	0.08 (0.14)	SM
Baja California, Mexico	1,464 (1,598)	0.62 (0.67)	SM
Guaymas, Mexico	12 (16)	0.17 (0.06)	SF
Mazatlan, Mexico	27 (35)	0.96 (1.03)	SF
Manzanillo,Puerto Vallarta, Mexico	33 (251)	0.73 (0.39)	SF
Acapulco, Ixtapa, Zihuatanejo, Mexico	177 (94)	1.93 (1.52)	SF
Guatemala	30 (38)	4.63 (3.50)	SF
Costa Rica	66 (62)	1.18 (1.81)	SF
Panama	79 (109)	1.20 (0.86)	SF
Colombia	8 (15)	0.62 (0.33)	BLM
Japan	46 (75)	0.26 (0.09)	BLM
Guam, U.S.A.	5 (15)	0.60 (0.13)	BLM
Papua New Guinea	4 (50)	0.25 (0.04)	BLM
Marshall Islands	330 (115)	0.17 (0.12)	BLM
Midway Island	116 (0)	0.04 (0)	BLM
Kiribati	26 (47)	0.73 (0.89)	SF
Fiji	4 (8)	0 (0)	SF
Tahiti, French Polynesia	44 (56)	0.20 (0.57)	BLM
Vanuatu	270 (150)	0.57 (0.44)	BLM
Australia	110 (114)	0.36 (0.39)	BKM
New Zealand	10,000 (6,500)	0.36 (0.23)	SM
INDIAN OCEAN			
Kenya	18 (5)	0.67 (0.80)	SF
Maldive Islands	194 (161)	0.70 (0.70)	SF
United Arab Emirates	95 (68)	3.97 (5.81)	SF
Thailand	1 (0)	3.00 (0)	SF
ATLANTIC OCEAN			
Atlantic total	81 (321)	0.95 (0.07)	BLM

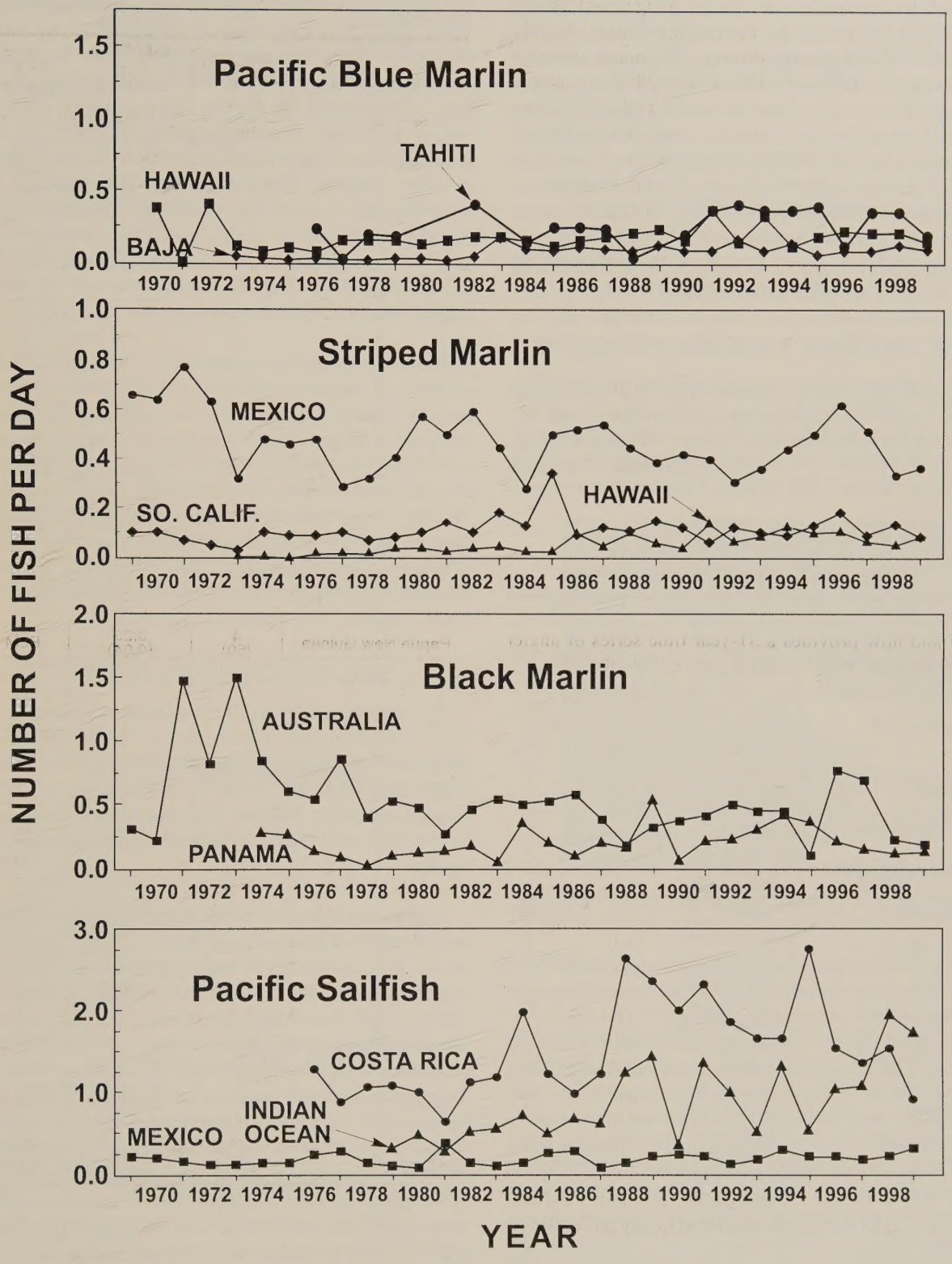


Figure 2. Catch per unit of effort (CPUE) in number of fish per angler day, for blue marlin, striped marlin, black marlin and Pacific sailfish reported by region, 1969 - 1999.

consistent with recent records. New Zealand reported a catch rate of 0.32. Catch rates of blue marlin off Hawaii (0.18), Costa Rica (0.27), Colombia (0.37) and Vanuatu (0.45) also remain consistent with recent results. Australia (0.17) and Panama (0.13) reported the highest catch rates for black marlin although catch per effort was below its long-term average. Excellent fishing for sailfish was reported for Mazatlán, Mexico, southward through southern Mexico (1.49), Guatemala (4.53), Costa Rica (0.88) and Panama (0.90). Catch rates of sailfish have decreased off Costa Rica as well as in the Indian Ocean. Anglers in the Indian Ocean reported 1.71 sailfish per angler day with excellent fishing in the Persian Gulf (U.A.E., 3.97) and Maldives (0.69).

THE BILLFISH TAGGING PROGRAM

The Billfish Tagging Program has been the core of the SWFSC's billfish research since 1963. Release and recapture data from tagged billfish are used to determine movement patterns, geographic distribution and growth patterns of billfish. The **Billfish Tagging Report** cards received for 1999 indicate a total of 679 billfish were tagged and released by 472 anglers and 151 fishing captains (Table 2). This is 6% more tag releases than in 1998. Only 29 striped marlin were tagged off southern California. This is much lower than recent years and probably related to the late arrival of marlin off the southern California coast. In Hawaii, 150 blue marlin and 109 striped marlin were reported tagged and released. An unusual number of short-billed spearfish were also tagged in 1999. Anglers reported tagging high numbers of spearfish April through August although January was the highest month with 52 tagged spearfish reported. Tagging off Mexico remained similar to past records with 92 billfish tagged off Baja California Sur and 35 more tagged between Mazatlán and Acapulco.

Table 2. Summary of billfish tagged in 1999.

AREA	SPECIES	TOTAL
PACIFIC OCEAN		
Southern California, U.S.A.	Striped Marlin	29
Hawaii, U.S.A.	Blue Marlin Striped Marlin Short-Billed Spearfish	150 109 186
Baja California, Mexico	Blue Marlin Striped Marlin Sailfish	13 72 8
Manzanillo, Mexico	Sailfish	1
Zihuatanejo, Mexico	Blue Marlin Sailfish Billfish, unid.	1 30 2
Nicaragua	Sailfish	20
Costa Rica	Blue Marlin Sailfish	2 2
Panama	Black Marlin	1
Midway Island	Blue Marlin Striped Marlin	6 1
Marshall Islands	Blue Marlin Sailfish	3 1
Tahiti, French Polynesia	Blue Marlin Marlin, unid.	14 5
New Zealand	Blue Marlin Striped Marlin	2 1
INDIAN OCEAN		
Mauritius	Blue Marlin Black Marlin	1 1
Maldive Islands	Sailfish	2
United Arab Emirates	Sailfish	14
ATLANTIC OCEAN		
Atlantic total	Blue Marlin	2

Each year we recognize the anglers, captains and fishers who tag and release billfish. In 1999, 472 individual anglers reported tagging at least one billfish. Individual recognition of each angler who reported tagging two or more billfish in 1999 is listed in Table 3. Unfortunately limited space prevents us from listing all 472 taggers. We also list the captains of charter and private boats who tagged significant numbers of billfish in specific regions (Table 4). Continued interest and cooperation by these captains have greatly enhanced the *Billfish Tagging Program*, and their efforts are truly appreciated.

TAG RECOVERIES IN 1999

Fifteen (15) recaptures of billfish were reported in 1999 including: one striped marlin, five blue marlin, seven sailfish, one swordfish and, for the first time, one short-billed spearfish (Table 5). Unfortunately the release information (**Billfish Tagging Report** card) has not yet been received for the striped marlin and two blue marlin.

Three of the recaptured blue marlin (possibly all five) were tagged off Kailua-Kona, Hawaii. Two of the blue marlin were recaptured by anglers and three by longline fishers operating north of Hawaii for swordfish. Time at liberty for the three ranged from five to 121 days in which they traveled up to 368 nautical miles (Table 5). The two recaptures where the tagger failed to return the **Billfish Tagging Report** may also have been tagged off the Kona coast as these tags were issued to individuals on the Big Island. Seven (7) of 96 sailfish tagged and released in the Persian Gulf, near Abu Dhabi (United Arab Emirates), in 1998 were recaptured in 1999. We now have 12 sailfish recaptured from the Persian Gulf by Iranian fishermen after traveling northwest up to 388 nmi (Figure 3). Last year we began supplying tag supplies for bluefin tuna in support of the AFTCO Tag-Flag Tournaments. Two tagged bluefin tuna were recaptured in 1998. One of

Table 3. Names of anglers tagging substantial numbers of billfish, and the number of billfish tagged and released. From **Billfish Tagging Report** cards received for 1999 calendar year releases.

ANGLER NAME	BILLFISH TAGGED
HAWAII, U.S.A.	
Henry Potts	10
Keishi Shiohata	7
Alexander Abramov	6
Hans Werner Koch	4
Dave Scott	4
Michael A. Vidal	4
Chris Blackwell	3
Bob Brack	3
Jim Burns	3
Ralph R. Conner	3
Michael D. Contreras	3
Austin Forman	3
Graham Pederson	3
Roy Spence	3
Jim Akana	2
Pat Brian	2
Dan Caylor	2
Larry Collins	2
Johnny L. Crain	2
Thomas Goodman	2
Lisa Gourley	2
Greg Hart	2
Molly Jacobsen	2
Shane Kano	2
Warren C. Keinath	2
Tracy Kessler	2
Dennis Lunski	2
Ryan Kainalu McGuckin	2
Steve Mitchell	2
Bruce Neely	2
Angelo J. Rossi	2
Sheryl Salvador	2
Steve Schumacher	2
Mary Anne Scott	2
Sue Stolzman	2
Bill Tansey	2
Darrell Ticehurst	2
Michael Ventura	2
Lee Young	2
BAJA CALIFORNIA, SUR, MEXICO	
Randy Forbes	8
Jock Albright	7
Don Anderson	6
Ned Falschehner	5
Bob Miller	5
Charlie Albright	3
Steve Brackmann	3
Brandon Hunt	3
Tom Young	3
Michael Bogue	2
Ronald Donnally	2
Costa Gialamas	2
Andreas Kotzur	2
Jerry Lewis	2
Calen Offield	2
SOUTHERN CALIFORNIA, U.S.A.	
Douglas A. Daniels	7
David M. Denholm	3
Stan Ecklund Sr.	2
Gary Jasper	2
Chuck Robertson	2
MANZANILLO-ACAPULCO, MEXICO	
Jose Moreno	6
Jay Bradshaw	3
Stephen Lamb	3
Fernando Mauries	3
Ken Ellis	2
Jessica Moreno	2
Gregory S. Walter	2

ANGLER NAME	BILLFISH TAGGED
NICARAGUA, CENTRAL AMERICA	
Thomas W. Murray	12
Mario Gonzalez	4
Nancy L. Murray	3
MIDWAY ISLAND, U.S.A.	
Lincoln E. Ahlo Jr.	2
TAHITI, FRENCH POLYNESIA	
Patrick Fourmantraux	4
Moana Allain	3
Winiki Sage	2
UNITED ARAB EMIRATES	
John Hoolihan	14

these moved from Isla Cedros north to just off Monterey, CA. Additional non-billfish tag recaptures included two common thresher sharks, tagged during SWFSC's annual shark abundance survey.

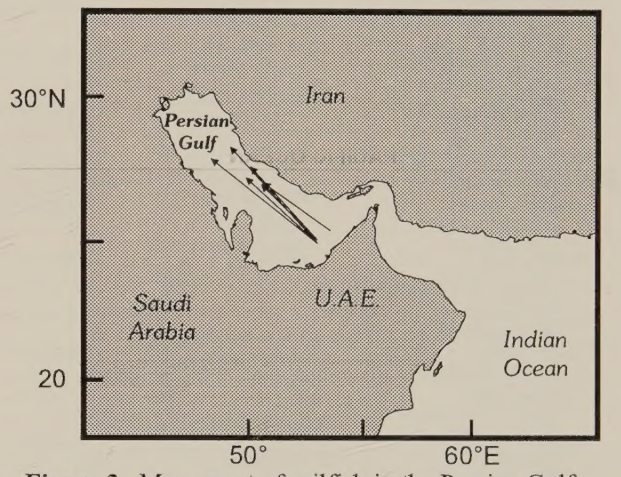


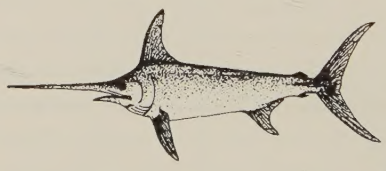
Figure 3. Movement of sailfish in the Persian Gulf.

PLEASE NOTE: Billfish recaptures for which the tag release information has not been received now number 75 or 11.1 percent. This also means about 11.1%, or 5,200, additional billfish have been tagged but the release information was not returned to the SWFSC. Every tag recapture is very important to this research effort. If you are going to take the time and make the effort to tag your catch, make it count. Tag and release your fish skillfully and return the yellow BILLFISH TAGGING REPORT. Though easily forgotten in the heat of battle and glow of success, returning the card is the most critical and final step in tagging your fish. This would be a good time to check your records, tackle boxes, salon cabinets, etc., for any of the **Billfish Tagging Report** cards from tagged fish not yet mailed to the SWFSC.

Table 4. Names of captains tagging substantial numbers of billfish, and the number of billfish tagged and released. From **Billfish Tagging Report** cards received for 1999 calendar year releases.

CAPTAIN NAME	TOTAL
HAWAII, U.S.A.	
Marty L. Sands	24
John Jordan	20
Guy Terwilliger	19
Kent Mongreig	18
Randy O. Orkisch	17
Mark Shultz	17
Tony Clark	14
James C. Dean	14
Scott Jones	14
Tom Siebler	14
Jerry Allen	13
Scott M. Fuller	11
Dennis R. Cintas	10
Robert McGuckin	10
F. McGrew Rice	10
Chip Van Mols	10
Mike Derego	8
Neal Isaacs	8
Freeman A. Roberts	8
Karl Adams	7
Marlin Parker	7
Tim Putnam	7
Reuben Rubio	7
Chip Fischer	6
Kevin M. Hogan	6
Rick Medenwald	6
Alan Abdill	5
Doug Armfield	5
Jeff Crews	5
Jeff Fay	5
Terry Kellam	5
Tad Luckey	5
Fran O'Brien	5
Mike Rand	5
Brian Toney	5
John Bagwell	4
John Burke	4
Tom Casey	4
Charles E. Haupert	4
Bill Casey	3
Bill Crawford	3
Del Dykes	3
Lance Gelman	3
Larry Hite	3
Steven D. Kaiser	3
Chris Lightfoot	3
William Ross	3
Dan Shaffer	3
Doug Barna	2
Frank R. Boyd	2
Joseph Demarke	2
William Dorr	2
Tim E. Hicks	2
Glen Hodson	2
Kevin Nakamaru	2
Darren M. Oshiro	2
Randy Parker	2
Robert Purdy	2
Gus Sellers	2
James G. Ward	2
Rahn Yamashita	2

CAPTAIN NAME	TOTAL
BAJA CALIFORNIA, MEXICO	
David M. Denholm	33
Albert Pellegrini	10
Javier Abaroa	6
Martin Verdugo Collins	6
Eric A. Wahrenbrock	6
Steve Murphy	5
John Algeo	3
John Beatty	3
David E. Brackmann	3
Lance Kluger	3
Harold Schram	3
Cooke Bausman III	2
Greg Donnally	2
John Talsky	2
SOUTHERN CALIFORNIA, U.S.A.	
Kendall W. Knight Jr.	7
Ron Johnson	5
Ned Falschlehner	3
Thomas A. Shanahan	3
Kathy Henderson	2
MANZANILLO-ACAPULCO	
Javier Vargas	12
Alfredo Vargas	7
Cheva Servando Ruiz	6
Leonardo Villa Alvarez	5
Jose Luis Servin Hernandez	2
COSTA RICA, CENTRAL AMERICA	
Thomas Carton	2
Peter E. Wishney	2
NICARAGUA, CENTRAL AMERICA	
Juan Herrera	19
MIDWAY ISLAND, U.S.A.	
Chris Sheeder	5
TAHITI, FRENCH POLYNESIA	
Francis Blais	5
Alain Durand	4
Jean-Pierre Tanguy	3
NEW ZEALAND	
Jim Byrne	3
MALDIVE ISLANDS	
Gilles Sandrin	2



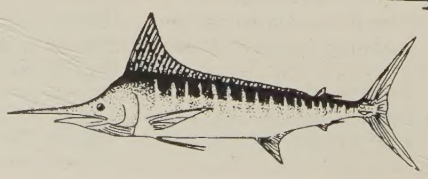
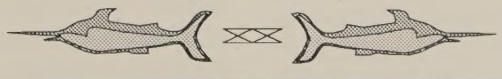


Table 5. Tag recovery information.

TAGGER/ CAPTAIN	RELEASE DATE	RELEASE LOCATION	RECOVERY DATE	RECOVERY LOCATION	DAYS FREE	MILES/ DIRECTION TRAVELED
STRIPED MARLIN						
NO RELEASE DATA Tag# A-35977	-	-	07/01/1999	25°30'N 163°30'W Northwest of HI	-	-
BLUE MARLIN						
Justin George Bill Crawford	12/26/1998	19°30'N 156°00'W Kailua-Kona, HI	01/20/1999	19°52'N 154°06'W Northeast of HI	25	154 - ENE
Dan Richards Sean Cleaver	12/27/1998	19°38'N 155°59'W Kailua-Kona, HI	04/27/1999	20°12'N 162°29'W Northwest of HI	121	368 - WNW
Bob Brasher Bill Casey	09/06/1999	19°30'N 156°00'W Kailua-Kona, HI	09/11/1999	19°31'N 155°56'W Off Keauhou Bay, HI	5	4 - ENE
NO RELEASE DATA Tag# A-53251	-	-	10/16/1999	19°35'N 156°02'W VV buoy, Kailua-Kona, HI	-	-
NO RELEASE DATA Tag# A-34308	-	-	11/??/1999	23°25'N 158°19'W North of HI	-	-
SWORDFISH						
Steve Sexton	11/14/1999	41°24'N 49°18'W Grand Banks, Atl. Ocean	06/22/1999	43°04'N 27°14'W East Atl. Ocean	1,681	983 - ENE
SAILFISH						
John Hoolihan	01/24/1998	24°49'N 54°18'E Abu Dhabi	05/20/1999	27°58'N 50°17'E Persian Gulf	481	287 - WNW
John Hoolihan	03/27/1999	24°58'N 54°16'E Abu Dhabi	05/24/1999	28°28'N 50°58'E Persian Gulf	58	275 - NNW
John Hoolihan	4/11/1998	24°48'N 54°19'E Abu Dhabi	05/26/1999	27°18'N 51°34'E Persian Gulf	410	211 - WNW
John Hoolihan	2/26/1998	24°49'N 54°18'E Abu Dhabi	05/14/1999	27°04'N 52°08'E Persian Gulf	442	179 - NNW
John Hoolihan	2/19/1998	24°49'N 54°18'E Abu Dhabi	04/29/1999	27°43'N 51°44'E Persian Gulf	434	222 - NNW
Barry Panzer	02/28/1998	25°18'N 54°44'E Abu Dhabi	05/14/1999	27°18'N 52°00'E Persian Gulf	440	190 - WNW
John Hoolihan	03/28/1998	25°19'N 54°44'E Abu Dhabi	05/18/1999	27°10'N 52°03'E Persian Gulf	416	182 - WNW
SHORTBILLED SPEARFISH						
David D. Swanson Chris Lightfoot	02/03/1999	19°23'N 155°59'W C buoy, Kailua-Kona, HI	03/09/1999	21°43'N 154°40'W Northeast of HI	34	173 - NNE
COMMON THRESHER SHARK						
NMFS Shark LL Research Cruise	07/12/1998	34°01'N 118°41'W Santa Monica Bay, CA	10/02/1999	34°03'N 119°07'W Off Point Hueneme, CA	447	26 - WNW
NMFS Shark LL Research Cruise	06/23/1999	33°28'N 117°44' W Off Laguna Beach, CA	11/15/1999	33°15'N 117°37'W Off San Onofre, CA	145	14 - SSE
BLUEFIN TUNA						
Steve Brackmann David Brackmann	07/17/1999	32°10'N 118°17'W Butterfly Bank, US -Mexico border	08/14/1999	31°37'N 117°30'W Off Ensenada, Baja CA, Mexico	28	57 - ESE
Dan Griffith Norm Kagawa	07/09/1999	28°17'N 116°47'W Off Isla Cedros, Baja CA, Mexico	09/13/1999	36°47'N 122°26'W Off Monterey, CA	66	612 - NNW



PAPER REDUCTION ACT NOTIFICATION

The federal Paper Reduction Act requires we provide the reporting burden to all Survey respondents and billfish taggers. The reporting burden to complete the *Billfish Angler Survey* card and the Billfish Tagging Report is estimated to average five minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate to the SWFSC, P.O. Box 271, La Jolla, Ca 92038. Notwithstanding any other provision of the law, no person is required to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

THE PACIFIC RECREATIONAL BILLFISH FISHERY IN MEXICO*

In 1983 the government of Mexico restricted the use of longlines in the Pacific Ocean by limiting the catch of billfish within 50 nautical miles of the coastline exclusively to the sport fishery. The majority of management measures applied to striped marlin and swordfish in the northeastern Pacific waters of Mexico have been driven by recreational fishing groups interested in limiting the take of commercial fisheries. These measures may have improved the recreational catch, but they probably had little effect on the status of Pacific billfish. Approximately 20 permits to convert driftnet vessels fishing sharks and swordfish to longline operations were issued by the National Fishery Institute in early 2000. These longline vessels are restricted to fish areas north of 25°N and beyond the 50 nautical mile sport fishing zone.

The National Fishery Institute (Instituto Nacional de Pesca) began a monthly sampling program in the Mazatlán area in 1986, and in La Paz and Los Cabos in 1991. About 1,000 vessels in the sport fishery actively participate in tournaments, but effort has not been estimated. The fishery is monitored using information obtained from a required logbook system. An observer program began in 1999 and now collects data on effort (fishing trips), weight, length, species composition, and fishing areas. Catch-and-release has become common practice in recent years and only billfish of record sizes are landed.

The primary sportfishing locations for billfish in Mexico are located near La Paz and Los Cabos, Baja California Sur; Mazatlán, Sinaloa, and Manzanillo, Colima. Billfish catch and effort at Mazatlán are mostly targeted for sailfish and to a lesser degree striped marlin. The catch per trip for striped marlin has been steady since about 1989 while that of sailfish is more variable (Fig.4a). In La Paz and Los Cabos (Fig. 4b), striped marlin are the dominant billfish followed by blue marlin and sailfish. The catch per trip for striped marlin has increased since 1994 and the mean catch rates for blue marlin and sailfish have been fairly steady but with a decreasing tendency in recent years where data are available.

*Information provided by Instituto Nacional de Pesca, Mexico City, Mexico.

BILLFISH MOVEMENTS

Our recapture data indicate that blue marlin, striped marlin, and swordfish move extensively throughout the Pacific, but without specific patterns of migration. These

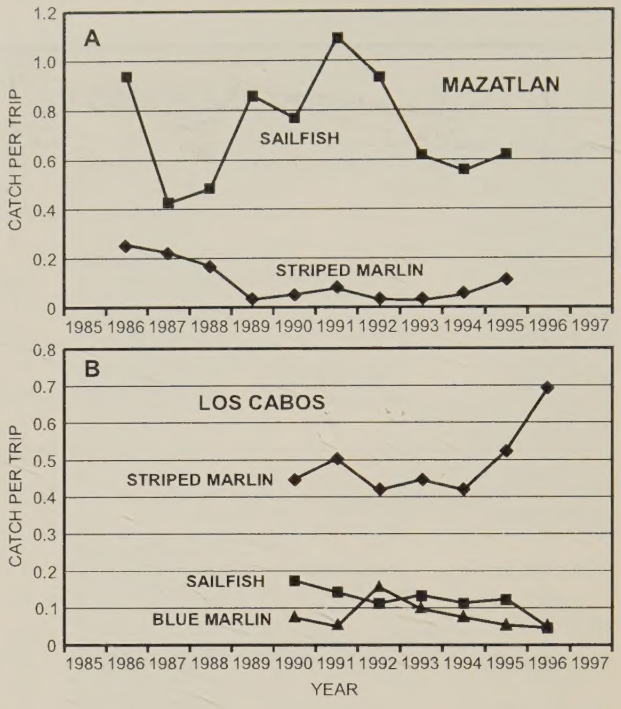


Figure 4. Catch per unit of effort (CPUE) in number of fish per trip in Mazátlan (A) and Los Cabos (B), Mexico. Data provided by Pedro Ulloa.

trans-Pacific movements, whether nomadic wanderings or generally dispersive, expose them to high-seas commercial and coastal recreational fisheries. Billfish tagged and released by anglers and fishers in the North Pacific are being recaptured in the central and western South Pacific by vessels operating in coastal and international waters. Clearly, it is time for fishery management conventions to characterize the international nature of these highly mobile stocks and to recognize the importance of recreational catch and release in the management process.

Striped marlin are widely distributed in the Pacific and generally move in a dispersive manner away from the Hawaiian archipelago and away from the central coast of Mexico. Striped marlin releases total 20,251 with 327 recaptures (Figure 5). Of those, 45 had missing release information and could not be analyzed. The majority of tagged striped marlin were released from Hawaii, southern California, and Baja California Sur. Recaptures indicate movement from southern California to Baja California Sur but show little or no movement in the reverse direction. Striped marlin tagged off southern California and Baja California have been recaptured after moving great distances with recaptures occurring in Hawaii, Peru, and near Pitcairn Island in the South Pacific. There is no indication of direct movement from Hawaii to the west coast.

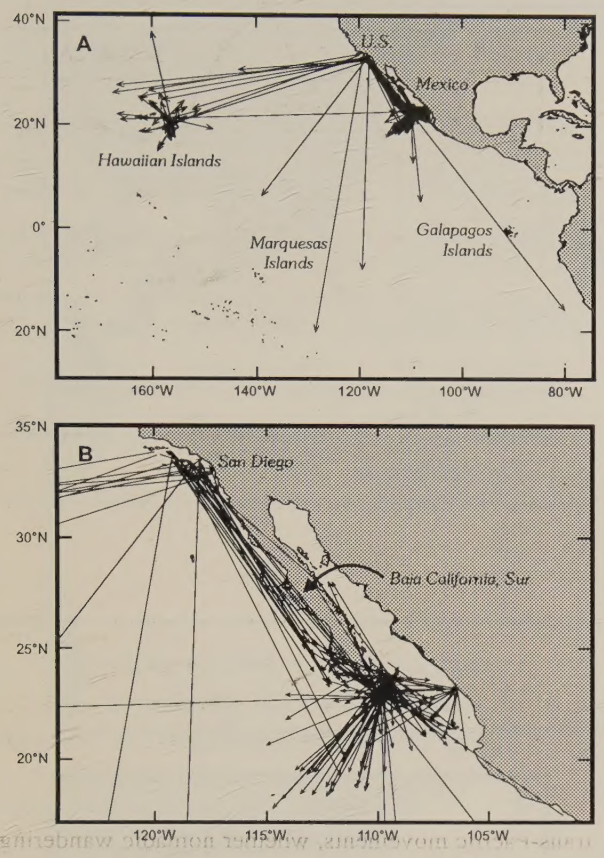


Figure 5. Striped marlin movements from tag recaptures in the north eastern Pacific (A) and detail of southern California and Baja California (B).

A total of 5,162 blue marlin have been reported tagged with 53 recaptures resulting in a 1.03% recapture rate. Of those, 10 had missing release information and could not be analyzed. Nearly half of these marlin were released and recaptured within 200 nm of Hawaii, indicating considerable inter-island movement and residence times (Figure 6a and 6b). Others released off Hawaii moved west and offshore from 208 to 597 nm. One blue marlin was recaptured after traveling to the Marquesas Islands (2,357 nm), another to the South China Sea (4,450 nm), and a third to New Caledonia (3,508 nm). Blue marlin tagged off Baja California Sur, Mexico, also traveled west to Hawaii, and to the Marquesas in the South Pacific. Blue marlin are infrequent visitors to southern California although two were reported moving 600nm south where they were recaptured near Magdalena Bay, Baja California Sur, Mexico.

A total of 494 broadbill swordfish have been tagged by cooperating billfish anglers and US commercial fishermen. Recaptures total 15 for a return rate of 3.04%. The SWFSC, along with cooperating southern California billfish anglers and commercial fishers, tagged 17 swordfish in 1978 in an effort to identify movement patterns in the Southern California Bight. Six of those swordfish were recaptured within 35 days and none had moved more than 30 nm. Swordfish tagged north of Hawaii on US longline vessels moved northeast toward the west coast of North America and were recaptured by other commercial fishing vessels (Figure 7). One swordfish was recovered near San Clemente Island, California; two others were recaptured by longline vessels fishing in international waters.

RESULTS OF AFTCO's 1999 PACIFIC TAG/FLAG TOURNAMENT

The second annual AFTCO Pacific Tag/Flag Tournament was another tremendous success. This year-long tournament, conducted from November 1 through October 31, is free to captains and anglers who tag and release fish in any of five categories. Captains and anglers who tagged Pacific billfish, bluefin tuna, thresher or mako sharks (and return the completed BILLFISH TAGGING REPORT cards) were automatically entered in the tournament. AFTCO's Tag/Flag Tournaments began on the east coast more than 10 years ago to reduce the unnecessary taking of billfish and tuna. Captains and anglers are recognized on both coasts for their accomplishments in billfish conservation through tag and release. This year's winners were recognized February 2, 2000 at the Billfish Foundation dinner at the Balboa Bay Club, Balboa CA. *Pacific Captain of the Year* trophy went to Gene Vanderhoek, while *Pacific Angler of the Year* went to Don Santorufo.

The tournament is supported by numerous organizations including the International Game Fishing Association, The Billfish Foundation, National Coalition for Marine Conservation, American Sportfishing Organization, and many popular sportfishing publications.

The SWFSC provides tagging supplies to participating anglers tagging billfish and bluefin tuna while the California Dept. of Fish and Game, Shark Tagging Program, provides tags for tagging sharks. AFTCO Tournament officials combine tagging results from the SWFSC with those of the CDFG and The Billfish Foundation to identify winners.

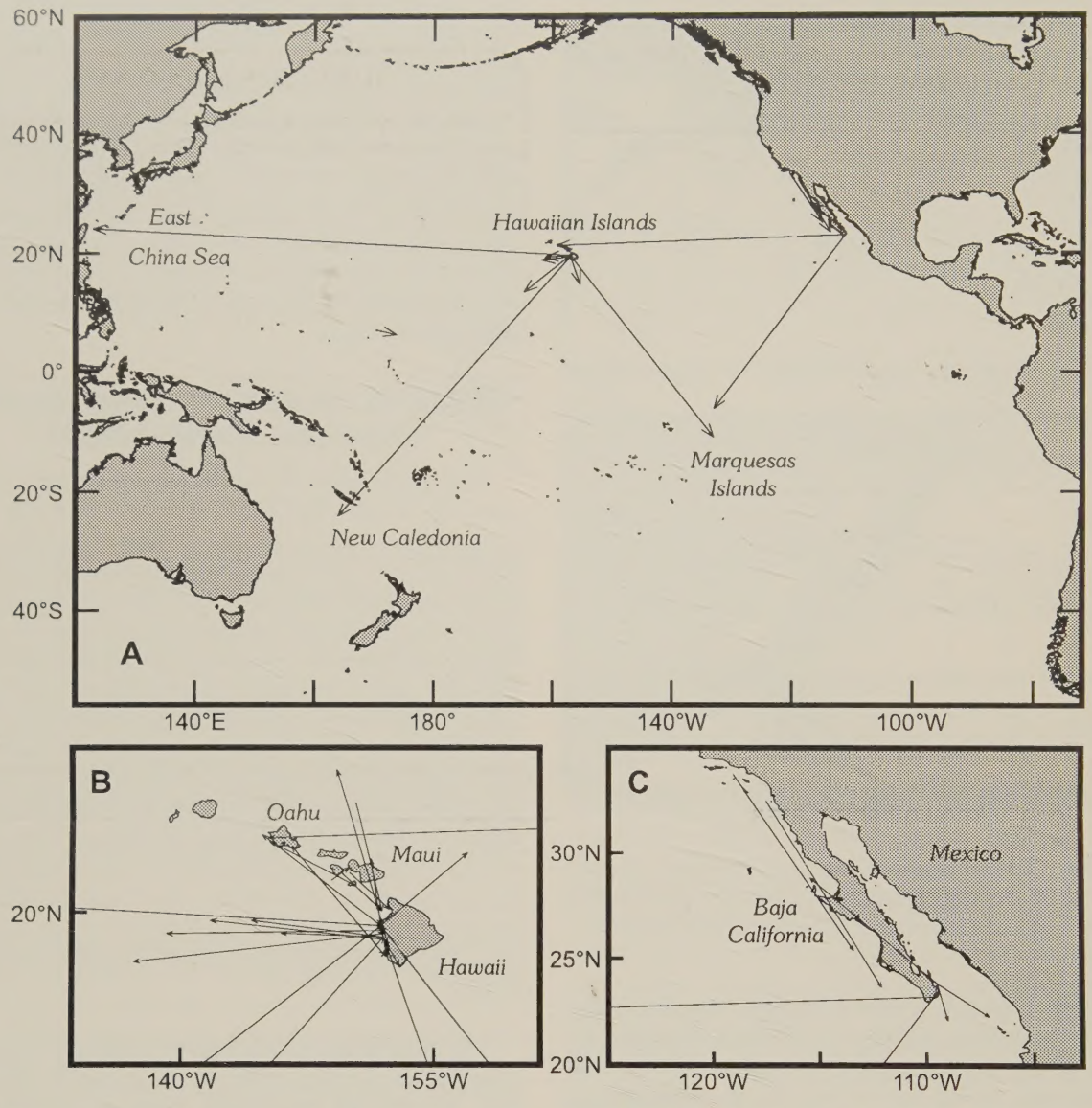


Figure 6. Blue marlin movements from tag recaptures in the North Pacific (A), in and around the Hawaiian archipelago (B), and in southern California and Baja California, Mexico (C).

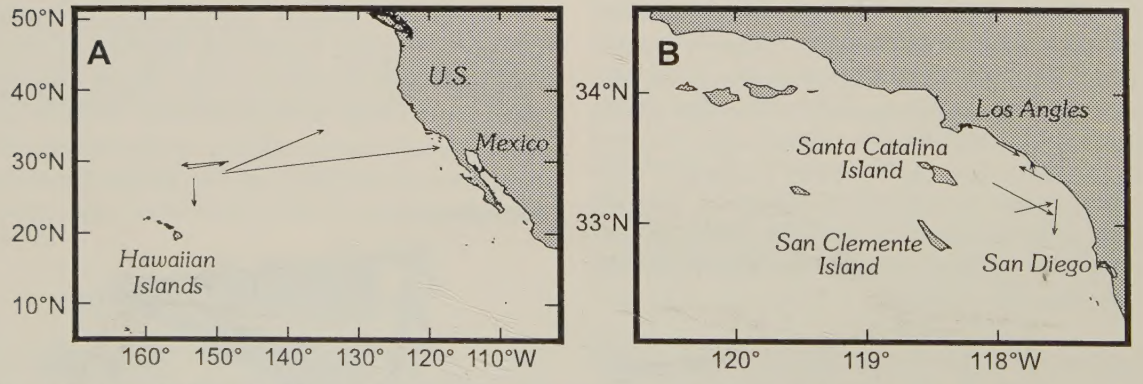


Figure 7. Broadbill swordfish movements from tag recaptures in the eastern North Pacific (A) and detail of southern California (B).

1999 AFTCO Tournament winners are shown below by category. Numbers in parentheses indicate numbers of fish tagged and released.

CATEGORY	CAPTAIN	ANGLER
1. Blue Marlin Black Marlin	Chris Sheeder (37) Kailua, HI	Jack Harris (11) Lake Forrest, CA
2. Striped Marlin	Julio Cota (106) Los Barriles, BCS	Harvey Barish(8) Cypress, CA
3. Sailfish	Ron Hamlin (1477) Guatemala	Fernando Aguilar (106) Guatemala
4. Mako Shark Thresher Shark	Dean Poe (23) Redondo Beach, CA	Keith Poe (23) Redondo Beach, CA
5. Bluefin Tuna	Norm Kagawa (19) San Diego, CA	Dave Brackman (12) Huntington Beach, CA

SURVEY RESPONSE

Trends in abundance indices are a key element in stock assessment models. This *Billfish Angling Survey* now provides a 31-year index of abundance in several high profile locations throughout the Pacific and has become most useful in the assessment process. Your continued response to the *Billfish Angling Survey* is still needed to better the index of the health of the billfish stocks important to recreational fisheries.

***Billfish Angling Survey* cards for fishing in the 2000 calendar year, will be mailed out in December of this year. Please complete the survey and return it by February 2001. Additional 2000 *Survey* cards will be available to all billfish anglers through this office. U.S. Government regulations require we purge our mailing list each year. If you wish to continue to receive the *Billfish Newsletter* but did not fish, please indicate "NO FISHING" on the *Billfish Angling Survey* form and return it to the Center. Your name will be retained.**

COMPLETING THE BILLFISH TAGGING REPORT CARD

- Fill out the card completely and as accurately as possible.
- Indicate latitude, longitude and locally known fishing area.
- Estimate the length of the fish as
  1. "eye-to-fork" length (EFL)
  2. "tip of lower jaw-to-fork" length (JFL).
- Estimate weight of the fish.
- Include any remarks, club name and complete address of the angler and the boat captain.
- Return cards promptly to the Southwest Fisheries Science Center. Tagging is of no value unless this *Billfish Tagging Report* card is returned. Postage is paid if mailed in the U.S.A.

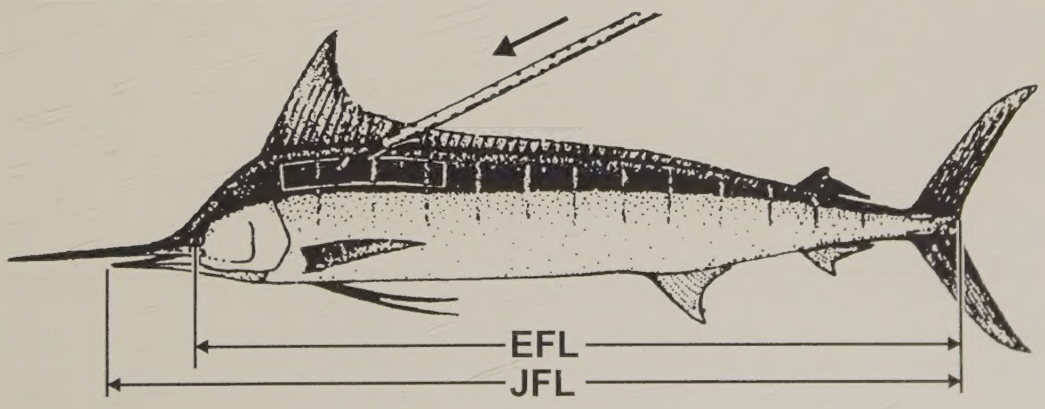
NOAA, National Marine Fisheries Service
BILLFISH TAGGING REPORT
PLEASE FILL IN DETAILS AND MAIL TODAY.

If mailing outside USA, postage must be affixed
Please return card, Otherwise tagging is of no value

TAG #: A33333

Latitude: 33° 14' N Longitude: 118°14' W
Locality: East End Catalina Is. CA
Species: Striped Marlin Date: 6/10/98
Estimate length (tip of jaw to fork of tail): 72 inches. Weight: 140 lbs.
Fish Condition: Good Bait type: Plastic Lure
Angler: Bill Fish Fight time (minutes): 23
Address: P.O. Box 271 La Jolla, CA Zip: 92038
Club: Anglers Club
Captain: Capt. Joe Dew Boat name: Good Grief
Address: P.O. Box 271 La Jolla, CA Zip: 92038

Response to this form is voluntary.
OMB 0648-0009, expiration date 08/31/2001
NOAA 88-162, 2/99



SEND US YOUR PHOTOGRAPHS

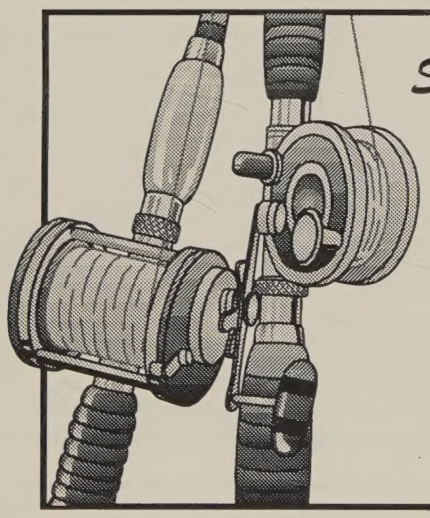
The Southwest Fisheries Science Center is looking for good photographs of billfish for the cover of next year's *Billfish Newsletter*. Color or black-and-white photos of billfish and/or fishing activities are appropriate. We would appreciate your sharing of photos and will give you full credit in the 2001 issue. A billfish baseball cap and plaque will be awarded to the winning photographer.

RETURN OF COMPLETED CARDS

Please look for any Billfish Tagging Report cards and mail them to this office. More than 11% of the 830 billfish tag recoveries have no release information. Though not as exciting, returning the release information is just as important as tagging a fish.

ACKNOWLEDGEMENTS

The information reported here would not be possible without the cooperation of thousands of anglers and volunteers who support these investigations. Your efforts and assistance are greatly appreciated. We welcome reader comments and suggestions concerning the content of the *Billfish Newsletter*. Roy Allen and Henry Orr designed the newsletter. The Billfish Newsletter can also be accessed on the Southwest Fisheries Science Center's home page under 'Publications' at http://swfsc.ucsd.edu. We also thank Randall Rasmussen for placing the Billfish Newsletter on the SWFSC's web page and to Chuck Oliver for constructing and managing the PacFAAB web page.



Smooth seas and good fishing,

David B. Holts, Fishery Biologist

Douglas W. Prescott, Computer Specialist

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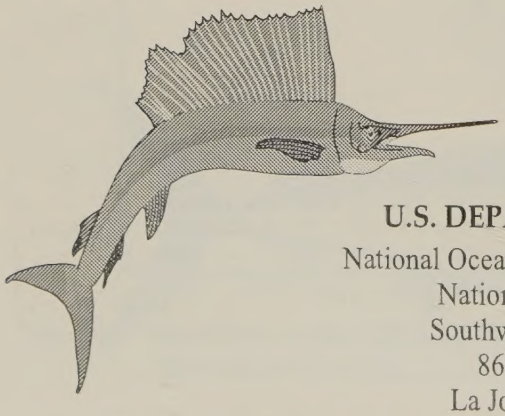

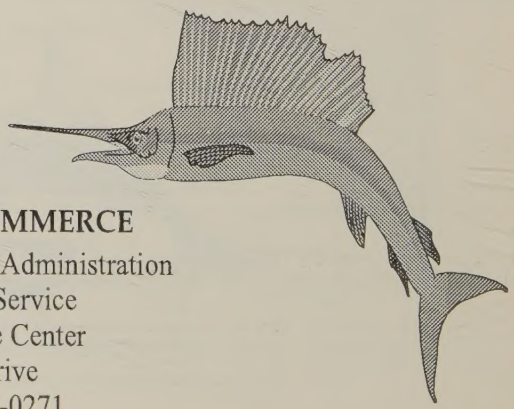

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